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COLONIZATION OF EUROPEAN CORN BORER PARASITES IN 1940<sup>1/</sup>

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The 1940 colonization program for corn borer parasites emphasized the recolonization of the egg-larval parasite Chelonus annulipes Wesm. in the Hudson River Valley in New York State and the distribution of the larval parasite Macrocentrus gifuensis Ashm. in Massachusetts, Rhode Island, Connecticut, eastern New York, and New Jersey.

One hundred fourteen colonies, totaling 112,711 individuals of C. annulipes were liberated during 1940. The size of colonies ranged from 739 to 2,247 adults, including both sexes, but most colonies consisted of approximately 1,000 parasites. Of the liberations made, 110 colonies or 109,213 adults were released in the Hudson River Valley in Albany, Columbia, Dutchess, Greene, Orange, Rensselaer, and Ulster Counties, N. Y., where work with this parasite was concentrated this season. It was planned to release a line of colonies of this parasite extending approximately 80 miles on either side of the Hudson River, with the individual colonies spaced at 2-mile intervals. It was believed that this procedure would provide an optimum opportunity for the establishment, dispersion, and rapid attainment of maximum effectiveness of the parasite. In general, this plan was carried out but lack of host material, unsuitable topography, and other factors made some modification of the program necessary in actual practice. Availability of the parasite in larger numbers than anticipated made it possible to make a second series of releases on both sides of and several miles back from the Hudson River. The territory from Newburg to Cohoes (north of Albany) on the west side of the river and from Beacon to Troy on the east side, and extending up to 10 miles from the river, was colonized with C. annulipes during 1940.

Three colonies, totaling 1,251 adults, of C. annulipes were released in Atlantic Township, Monmouth County, N. J. One colony of 2,247 adults of this parasite was released in Berlin Township, Erie County, Ohio, as a further test of this parasite in the western part of the area infested by the European corn borer.

The releases of C. annulipes during the 1940 season were perfectly timed to synchronize with host development in the release territory. It is known that the adults of this species live for at least 10 days or more under normal

<sup>1/</sup>For previous releases of European corn borer parasites in the United States see Insect Pest Survey Bul., Sup. to No. 9, vs. 18 and 19, 1938 and 1939.

field conditions and, consequently, that releases should be made to coincide with the start of host oviposition. The first releases of this parasite were made on the afternoon of June 4 and the first host eggs were found in the field the following morning. Releases continued (in the Hudson River Valley) until June 16 by which date the peak of host egg deposition had been reached, but large numbers of corn borer eggs were still being deposited nightly. The small number of releases in other localities were also well synchronized with the presence of host eggs.

The 109,213 adults of C. annulipes released in the Hudson River Valley were reared at the Toledo, Ohio, corn borer laboratory, Epehestia kuehniella Zell. being utilized as a host for this purpose. Chelonus adults for the release in Ohio were also from this source. The adults of this parasite released in New Jersey were obtained incidental to the domestic procurement of Macrocentrus gifuensis. Table 1 lists the releases of C. annulipes made during 1940.

Thirty-nine releases, totaling 78,072 adults, of the polyembryonic braconid Macrocentrus gifuensis were made during the 1940 season. This parasite was released on a county basis, in most cases limited to 1 colony of approximately 2,000 adults, inclusive of both sexes, per county. All 8 counties in Connecticut received liberations of this parasite. In Massachusetts releases were made in 6 of the 11 counties in which this parasite is not known to be established. The 3 counties in Rhode Island in which this parasite is not found or is scarce, received releases. In eastern New York 10 counties, including Suffolk County, Long Island, as well as counties in the Hudson River Valley, received releases, and extra releases were made in Columbia and Rensselaer Counties where the borer has recently been particularly abundant. In New Jersey 8 counties received releases of this parasite, including most of the counties in this State not previously colonized in which borers have been destructive. No releases of this parasite were made south of New Jersey, owing to the comparatively low populations of the host at the time releases were made at the other points.

One retest release of M. gifuensis was made in Adams Township, Lucas County, Ohio, where a multiple-generation strain of the borer is now building up in a locality in which the borer was previously limited to a single-generation cycle. It is believed all releases of M. gifuensis accomplished during the 1940 season were synchronized with host presence in stages favorable to attack by this parasite.

All M. gifuensis adults released were reared at the Moorestown, N. J., corn borer laboratory from host material collected in southeastern Massachusetts in the fall of 1939. This imported parasite has increased to such an extent in that locality that, so far as known, it is now more abundant than in any European or Oriental country from which it was first imported. Table 2 lists the releases of M. gifuensis made in the United States during 1940.

The adults of Chelonus annulipes, which were reared at Toledo, Ohio, were shipped from that city by railway express utilizing ice-cooled, insulated



shipping boxes.<sup>2/</sup> Of the 110,000 adults of this parasite shipped in this way during the 1940 season, only 787 died en route from the shipping point to time of release in the field, a mortality of only 0.7 percent.

A total of 78,815 adults of M. gifuensis for release in the United States were handled during the 1940 season. From the time of collection to release in the field, 743 of these adults died, a mortality of only 0.9 percent, an unusually low mortality for this fragile species.

Incidental to a study of corn borer parasite status in the field, a small number of parasites were reared late in the season. These adult parasites were shipped to Canada for release in the corn borer infested area around Quebec. The parasites were shipped during the period August 12-19, inclusive. A total of 6,005 Macrocentrus gifuensis and 330 adults of Inareolata punctoria Roman were in the consignments sent. The mortality in these shipments was 2.7 percent for the former species and 2.1 percent for the latter.

#### SUMMARY

A total of 190,783 European corn borer parasites were released in the United States during 1940. Of this number 112,711 were adults of the egg-larval parasite Chelonus annulipes Wesm. and 78,072 were adults of the braconid Macrocentrus gifuensis Ashm. Most of the adults of the former species were laboratory-reared, utilizing Ephestia kuehniella Zell. as the host. M. gifuensis was obtained from corn borer larvae collected in southeastern Massachusetts, where this imported parasite is well established and abundant.

Releases of C. annulipes were concentrated in the Hudson River Valley, N. Y. Releases of M. gifuensis were made in southern New England, in eastern New York, including Long Island, and in New Jersey. A test release was made in northern Ohio.

Only 0.8 percent mortality was experienced in the handling of 192,313 parasites from emergence in the laboratories to liberation in the field in the various States.

Consignments of Inareolata punctoria Roman and Macrocentrus gifuensis for release near Quebec, Canada, totaled 6,335 adult parasites.

<sup>2/</sup> Shipping containers approximately as described in Bureau of Entomology and Plant Quarantine ET Circular 77.

Table 1.--Liberations of Chelonus annulipes Wesm. in the United States  
during 1940

State and county	Township	Date of release	Colonies	Adults released
			Number	Number
New Jersey:				
Monmouth-----	Atlantic	June 5-21:	3	1,251
Subtotal (N. J.)----	--	--	3	1,251
New York:				
Albany-----	Bethlehem	June 6-7 :	7	6,968
	Coeymans	6 :	2	1,993
	Colonie	7 :	7	6,953
	New Scotland	7 :	1	998
Columbia-----	Claverack	14 :	2	1,993
	Clermont	11-16:	3	2,742
	Germantown	11 :	1	999
	Ghent	13 :	2	1,999
	Greenport	11-16:	4	3,493
	Kinderhook	12-13:	8	7,945
	Livingston	16 :	3	2,245
	Stockport	11 :	2	1,999
	Stuyvesant	11-14:	9	8,976
Dutchess-----	Clinton	8 :	1	989
	E. Fishkill	16 :	1	748
	Fishkill	8 :	4	3,983
	Hyde Park	8 :	5	4,979
	La Grange	16 :	2	1,498
	Poughkeepsie	8-15:	4	3,722
	Red Hook	11-16:	2	1,746
	Rhinebeck	8 :	1	992
	Wappinger	8-16:	2	1,743
Greene-----	Catskill	4-5 :	4	4,840
	Coxsackie	5-6 :	3	2,993
	New Baltimore	6 :	1	998
Orange-----	Montgomery	15 :	2	1,498
Rensselaer-----	E. Greenbush	13 :	3	2,985
	Schodack	11-14:	4	3,991
Ulster-----	Esopus	4 :	2	2,463
	Hurley	5-15:	2	1,733
	Kingston	4 :	1	1,234
	Lloyd	4 :	2	2,444
	Marbletown	15 :	2	1,995
	New Paltz	15 :	1	748
	Flattekill	7 :	1	997
	Rosendale	15 :	1	746
	Saugerties	4-5 :	4	4,930
	Ulster	4-5 :	4	4,915
Subtotal (N. Y.)----		--	110	109,213
Ohio:				
Erie-----	Berlin	18 :	1	2,247
Subtotal (Ohio)----	--	--	1	2,247
Total-----	--	--	114	112,711

Table 2.--Liberations of *Macrocentrus gifuensis* Ashm. in the United States during 1940

State and county	Township	Date of release	Adults released
			Number
<b>Connecticut:</b>			
Fairfield-----	Stratfield	June 25	1,993
Hartford-----	E. Hartford	26	1,979
Litchfield-----	Litchfield	27	1,993
Middlesex-----	Haddam	25	1,991
New Haven-----	Milford	25	1,994
New London-----	Gales Ferry	25	1,997
Tolland-----	Tolland	26	1,995
Windham-----	Pomfret	26	1,992
Subtotal (Conn.)-----	--	--	15,934
<b>Massachusetts:</b>			
Essex-----	Danvers	June 28	1,953
Franklin-----	Bernardston	28	1,968
Hampden-----	Agawam	28	1,984
Hampshire-----	Hadley	28	1,977
Middlesex-----	Concord	28	1,947
Worcester-----	Charlton	26	1,994
Subtotal (Mass.)-----	--	--	11,823
<b>New Jersey:</b>			
Atlantic-----	Egg Harbor	June 23	1,996
Bergen-----	Paramus	20	1,996
Camden-----	Clementon	18	1,972
Gloucester-----	Washington	18	1,966
Mercer-----	Washington	19	1,979
Middlesex-----	Monroe	19	1,988
Monmouth-----	Atlantic	19	1,992
Do.-----	do.	July 3	1,527
Ocean-----	Brick	June 19	1,981
Subtotal (N. J.)-----	--	--	17,397
<b>New York:</b>			
Albany-----	Colonic	June 20	1,983
Columbia-----	Kinderhook	22	1,972
Do.-----	do.	22	1,973
Dutchess-----	Hyde Park	22	1,995
Greene-----	Coxsackie	20	1,988
Orange-----	Montgomery	20	1,989
Rensselaer-----	E. Greenbush	22	1,986
Do.-----	Schodack	22	1,988
Saratoga-----	Malta	20	1,997
Schenectady-----	Glenville	20	1,987
Suffolk-----	Riverhead	27	1,569
Ulster-----	Marbletown	20	1,986
Subtotal (N. Y.)-----	--	--	23,413

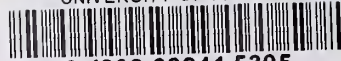


Table 2.--Liberations of Macrocentrus gifuensis Ashm. in the United States during 1940--(Continued)

State and county	Township	Date of release	Adults released
			Number
Ohio:			
Lucas-----	Adams	June 29	3,537
Subtotal (Ohio)-----	--	--	3,537
Rhode Island:			
Kent-----	Coventry	25	1,993
Providence-----	Gloucester	25	1,989
Washington-----	Richmond	25	1,986
Subtotal (R. I.)-----	--	--	5,968
Total-----	--	--	78,072